PMC200 Multifunctional Power Meter

Installation User Manual Ver1.0

KINGSINE
PMC200
L1
220.0
V
L2
220.0
L3
220.1
AVG
220.0
I
U
P-Q-S
PF-F
E-⊘
Menu

Kingsine Electric Automation Co., Ltd.

Attention for PMC200 Installation

⚠ *Danger and Warning*

- The device has danger of electricity, it will cause serious injuries even death if you don’t avoid any case.

- The device shall be installed, operated, used and maintain by professional operator. Our company won’ t takes any responsibility if misoperation to cause any results.

Catalogue

1. Product overview 6

2. Product function and characteristic 6

3. Security prevent 23

4. Installation and connection 25

5. Communication 33

6. Operation 34

7. Maintain and error troubleshooting 39

Appendix A：Technical index 41

Appendix B：Register list 45

Appendix C Ordering Information 79

1. Product overview

PMC200 Multifunctional Power Meter is a multi-function monitoring meter, it combines function of collecting data and control, and it can replace many kind of meter, relay, transmitter and others components. PMC200 can be installed different position in electricity distribution system.

PMC200 Multifunctional Power Meter has RS485 communication interface, it can integration into any electric monitoring system and collect data and remote control by configure management software or other industry configuration software.

PMC200 Multifunctional Power Meter is a real measurement meter based on real virtual value, it can do the accurate measurement for high highly nonlinear load, it can measure accurately many electric power parameters through advanced technology of grid frequency sampling synchronization and you can see all measurement value and the max/min value as well as demand display value via display screen or via software remote control.

2. Product function and characteristic

2.1 Function of Multifunctional Power Meter

Sheet 1

Host function and characteristic	
Instantaneous real virtual value	
Current	Single phase and Neutral
Phase voltage	The average of single and three phase
Line voltage	The average of single and three phase

The amount of active, reactive, apparent power	The amount of single and three phase
power factor	The amount of single and three phase
frequency	
MIN/MAX	
current	
phase voltage, line voltage	
general active, reactive, apparent power	
general power factor	
frequency	
THD I and THD U	
Demand and peak value	
Each phase current	current value and peak value
general active, reactive, apparent power	current value and peak value
Electric energy	
Input output active electric energy	1 channel pulse output
Input output reactive electric energy	1 channel pulse output
apparent power	
Electric energy multi-rate	
8 multi-rate time, 4 rates can be set	
Electric energy quality	
Humorous aberration	current and voltage
31 times humorous analyses	current and voltage

Event record
100pcs SOE event record, time distinguish can reach to 1ms
Warning system
6 warning channels with configurable limit value
4 warning channels with configurable logic
Communication
RS485/MODBUS -RTU protocol
Display
Large screen STN liquid display
Real time clock
Year, month, date, minute, second
Others
Support program online upgrade

Sheet 2

Auxiliary module function and characteristic
Binary input module
8 channels binary input, time distinguish rate of status change time can reach to 1ms
Relay output module
4 channel relay output, warning setting is available for local exceed confine and remote control also
Analog input/output module
1 channel 4-20mA DC analog input measurement

1 channel 0-5V analog input measurement
2 channels 4-20mA DC analog output, transducer can be configurable
Communication module
a) RS232 communication module
b) ProfiBus-DP communication module
c) TCP/IP Ethernet expand module

2.2 Measurement of instantaneous value

PMC200 Multifunctional Power Meter can online monitor instantaneous value of three phase current, voltage, active power, reactive power, apparent power, power factor and frequency, refresh once every second, the instantaneous value can be checked via display scrren.

PMC200 Multifunctional Power Meter can connected directly without outer connect when measure voltage less than or equal to 277V(phase)/480V(line), otherwise, it must to request outer connect. When adopt outer PT, please pay attention to PT linearity and accuracy level, otherwise, it will affect the whole measurement accuracy of meter.

PMC200 Multifunctional Power Meter must to adopt CT to current measurement with under general condition. The hypo-grade rating output of CT request to comply with rating current input of electric power parameter test. When adopt outer CT, please avoid open circuit during connecting, otherwise, it will cause equipment damaged even user injured under primary excitation action condition to cause high voltage in hopy-grade.

2.3 The Maximum / Minimum of instantaneous value

When real time read to Max or Min value, PMC200 Multifunctional Power Meter will record these value to as MIN/MAX value, PMC200 will save these value and the time which caused these value to nonvolatile location, data won` t lose when electricity drop off suddenly, MIN/MAX value can be displayed in display screen.

2.4 The calculation of Demand and peak value demand

DMD is the average in period of time. PMC200 Multifunctional Power Meter adopt calculation demand of sliding area, PMC200 can be set a calculation cycle with 1-60 minutes demand, if calculation cycle between 1-15 minutes, DMD calculation will be refreshed every 15 second, if calculation cycle between 16-60 minutes, DMD calculation will be refreshed every 60 seconds.

Peak value demand is the DMD max value, when peak value demand produce, PMC200 Multifunctional Power Meter will save these value and the time which caused these value to nonvolatile location, data won` t lose when electricity drop off suddenly, MIN/MAX value can be displayed in display screen.

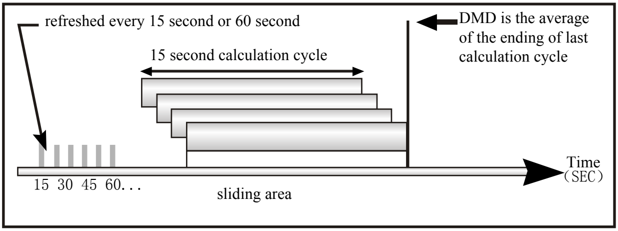

refreshed every 15 second or 60 second
15 second calculation cycle
DMD is the average of the ending of last calculation cycle
Time (SEC)
15 30 45 60...
sliding area

chart (1)

2.5 Electric energy and Electric energy pulse output

PMC200 Multifunctional Power Meter can calculate and active electric energy & reactive electric energy of flowing into & flowing out cumulation as well as cumulate apparent electric energy, data won` t loss when electricity drop off, it can display in the display screen, display range: 0.0-99999999.9 kWh, it will re-cumulate to calculate when if full calculation. Electric energy cumulation is one time value of PT, CT.

PMC200 Multifunctional Power Meter include electric isolated 1 channel active electric energy pulse output and 1 channel reactive electric energy pulse output, electric energy pulse constant can be set by communication protocol, setting range : 1000-5000 imp/kWh

2.6 Electric engergy multi-Rate

PMC200 Multifunctional Power Meter can realize subsection calculation, time-sharing calculation, optimize electro-efficiency effectively. It adopts tine, peak, flat, vale to calculate separately in different period.

PMC200 Multifunctional Power Meter can calculate max 8 time period electric energy, and the based calculation unit is half and hour, which mean 8 time period in a day for 24 hours, every segment based unit is half hour, time period starting time default is from 0 segment(it can be any segment), and the following segment time period shall set each segment origination segment according sort ascending to list out strictly. PMC200 Multifunctional Power

Metercan support max 4 rate segments, each rate can support input output active electric energy, input output reactive electric energy and apparent electric energy, multi-rate electric energy can be displayed in the display screen.

In order to understand multi-rate function, the following as example: if customer everyday electricity calculation divide to 8 segment to calculate, time segment division as below Dig.

Time	**Time of starting time**	**Multi-rate**
Time 1	4	T1（peak）
Time 2	10	T2（vale）
Time 3	16	T3（flat）
Time 4	22	T4（tine）
Time 5	28	T1（peak）
Time 6	34	T2（vale）
Time 7	40	T3（flat）
Time 8	46	T4（tine）

1# time period starting time is from 2 o` clock, close at 5 o` clock, calculate segment is T1, 2# time period starting time is from 5 o` clock, close at 8 o` clock, calculate segment is T2, the rest may be deduced by analogy, 8# time period starting time is from 23 o` clock and the second day 2 o` clock close, calculate segment is T4. The same rate electric energy can be amalgamated together for calculation.

2.7 Humorous and THD ratio

PMC200 Multifunctional Power Meter measure max 31 times for voltage, current and humorous, it can be displayed 0-12 times humorous in display screen, if use communication protocol, it can get 0-31 times humorous value. PMC200 Multifunctional Power Meter adopt below formula to calculate humorous:

$$HR_h = \frac{HR_h}{HR_1} \times 100\%$$

PMC200 Multifunctional Power Meter can measure voltage, current THD. The THD is ratio between humorous content and fundamental wave, it not only provides the general situation of wave "quality", but also effective method for diagnosing electric energy quality. PMC200 Multifunctional Power Meter adopt below formula to calculate THD

$$THD = \frac{\sqrt{(H2)^2 + (H3)^2 + (H4)^2 + \ldots\ldots\ldots}}{H1} \times 100\%$$

2.8 Event record

In order to assist user to analyze all kinds of faults for electric system, PMC200 Multifunctional Power Meter provide depth 100pcs SOE event record, user can do event search orientation according to SOE event record, use communication protocol can get SOE event record message.

PMC200 Multifunctional Power Meter can record binary state change message, relay action message, limit value and logic warning channel state message etc. event style.

PMC200 Multifunctional Power Meter record event happen time through UNIX time format, distinguish can be 1ms. UNIX time is current time which relative to the total second number of 0 second 0 minute 0 hour 1st January 1970.

Event record will come out following format message through communication protocol resolution:

Event type	**Event time**
Binary 1 close	888 millisecond 55 minute 17 hour 19th Nov. 2010
A phase current upper limit	999 millisecond 55 minute 17 hour 19th Nov. 2011

2.9 Warning system

PMC200 Multifunctional Power Meter has user user-defined warning system, it can monitor all electric parameter of power grid and set requested action. PMC200 Multifunctional Power Meter can activate max 10 warning system synchronously, 6 limit value warning channel and 4 logic value warning channel. When the warning began, display screen will display warning indication and record as event.

2.9.1 Limit value warning

PMC200 Multifunctional Power Meter has 6 limit value warning channel, let one channel effect except activate this channel, it also must set as below,

Setting content	**Description**
Threshold Crossing type	Divide to Upper Threshold-crossing and lower threshold-crssing
Limit value object	Limit value object can be 15pcs, and set discretionarily: 0 is A phase current

	1 is B phase current 2 is C phase current 3 is zero-sequence current 4 is max unimbalance current(Reservation) 5 is current phase lost 6 is A phase voltage 7 is B phase voltage 8 is C phase voltage 9 is AB line voltage 10 is AB line voltage 11 is CA line voltage 12 is max unimbalance voltage(Reservation) 13 is max unimbalance voltage(Reservation) 14 is voltage phase lost
Threshold Crossing valve value	User can defined threshold crossing valve value as demand
Limit value warning arrearage time	In the whole arrearage time, if limit value object return to limit value, the warning will not be activate.
Output target of value limit alarm	When this alarm activated, the user can correlative Spring any relays.

2.9.2 Logic value warning

PMC200 Multifunctional Power Meter has 4 Logic value warning channel, Logic value warning system is activated base on the logic adjust that made onto the monitor subject, maximum the monitoring three subjects on same time, the parameter settings as bellow:

Setting	**Description**
Logic adjust type	two type: Logic Or / Logic and
Logic subject 1	Logic subject max. can reach to 15, can freely setting: 0 means don't adjust the subject 1 means Switch power S1; 2 means Switch power S2; 3 means Switch power S3; 4 means Switch power S4; 5 means Switch power S5; 6 means Switch power S6; 7 means Switch power S7; 8 means Switch power S8; 9 Means Value limit alarm channel RA1; 10 Means Value limit alarm channel RA1; 11 Means Value limit alarm channel RA3; 12 Means Value limit alarm channel RA4; 13 Means Value limit alarm channel RA5; 14 Means Value limit alarm channel RA6;
Logic subject 2	Same as above.
Logic subject 3	Same as above.

Truth condition of Logic subject	Truth condition that should be satisfied (when all Logic subject participate in the logical calculation.)
Lag time of Logic alarm	Within the lag time, if the logic subject return, then the alarm will not be active.
Output target of Logic alarm	When this alarm activated, the user can correlative Spring any relays.

2.10 AUX Module

2.10.1 Brief introduction

PMC200 Multifunctional Power Meter can extend Four different function module at the same time, can respectively realize the functions as: Switch Power Input Module, Relay output Module, Analog Input & output Module, Communication Module. The Four module installation position is A、B、C、D notch on the Host, the same module can only install one pc.

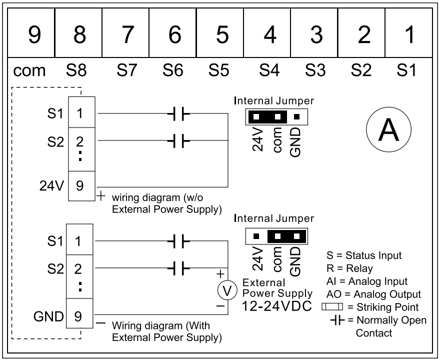
2.10.2 Switch power input Module

This module has 8 channel switch power input Module, installation position is A notch, used to monitoring the state signals (like Breaker's position signal, Isolator's position signal) etc, the time resolution of state change reach 1 ms. Also we can see the close state of the related node on the screen.

The node input voltage may choose, then selects the low pressure power source which the measuring appliance interior starts out, may also be suitable the exterior low pressure power source's input request. May divide into two kinds of specifications according to the node different voltage condition: Passive node and active node.

When the exterior status signal supplies a positional information merely, then needs electric power parameter observation meter interior output node closed time the feedback voltage signal, the outside passive contact wiring following chart (2) shows.

When the exterior status signal not only supplies the positional information, extra also provides the feedback voltage signal, this time the Power meter cannot use the internal electrical power supply to output, but must adjust its interior to jump the line hat to carry on the disposition, and makes the corresponding modification to the wiring. The outside active contact wiring following chart (2) shows.


9 8 7 6 5 4 3 2 1
com S8 S7 S6 S5 S4 S3 S2 S1
S1 1
S2 2
24V 9
+ wiring diagram (w/o External Power Supply)
Internal Jumper
24V com GND
A
S1 1
S2 2
GND 9
− Wiring diagram (With External Power Supply)
Internal Jumper
24V com GND
+ V −
External Power Supply 12-24VDC
S = Status Input
R = Relay
AI = Analog Input
AO = Analog Output
= Striking Point
= Normally Open Contact

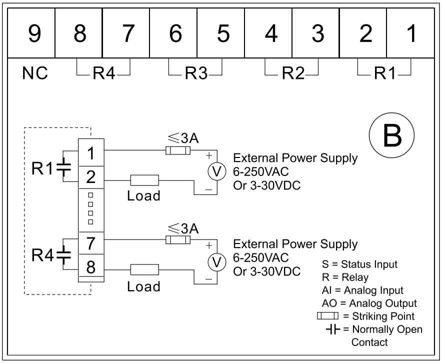
Chart（2）

2.10.3 Relay Output Module

The Power meter provides the expandable 4 group relay output module, installs the position to correspond on main engine's B slot, applies in the scene load control. The Relay control pattern may divide into long-distance and the local pattern:

- Local Pattern - The relay is observes and controls the meter control by the electric power parameter, warning system connection trigger control.
- Under local control pattern, relay working pattern separable: Normal, Block system and Fixed time three kind of patterns
- Normal working Pattern - When the Power meter has the warning to produce, the warning outputs when is connected the relay, the relay closes. When warning vanishing, the relay separates.
- Block working Pattern - When the Power meter has the warning to produce, the warning outputs when is connected the relay, the relay closes. When warning vanishing, the relay is at the closed position. If needs the relay separation, must suppose the relay the remote control pattern, the routing directive control relay separation.
- Fixed time Pattern - When the Power meter has the warning to produce, the warning outputs when is connected the relay, the relay closes. The relay maintains the movement condition in fixed time the time, when fixed time overflows, the relay separates.

No matter the relay in above what kind of situation, after the Power Meter loses the electricity, on the heavy electricity, the relay restores to often on status. May examine relay's closed position on the display monitor. The relay specification is 250Vac/5A,30Vdc/5A, if has the special demand, please when ordering carry on the special explanation. The relay module wiring following chart (3) shows.


9
8
7
6
5
4
3
2
1
NC
R4
R3
R2
R1
B
R1
1
2
≤3A
External Power Supply
6-250VAC
Or 3-30VDC
V
Load
R4
7
8
≤3A
External Power Supply
6-250VAC
Or 3-30VDC
V
Load
S = Status Input
R = Relay
AI = Analog Input
AO = Analog Output
= Striking Point
= Normally Open Contact

Chart（3）

2.10.4 Analog Input/Output Module

The Power parameter meter provides the expandable simulation quantity input/output module, installs the position to correspond on main engine's C slot, this module has 1 group 4-20mA direct current input survey, 1 group 0-5V DC voltage input survey, 2 group 4-20mA direct current output, the direct-current output simulation object may dispose.

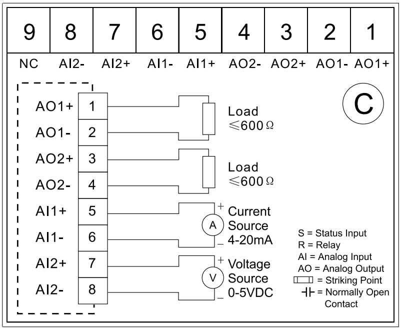
4-20mA and - the 5V DC current input survey mainly uses in sensors and transformer's and so on scene temperature, pressure survey, will simulate the quantity signal to transform the digital signal through the Power Parameter meter to transmit the far-end through the communication, carries on the data gathering. May also examine the observed value on the display monitor.

2 group 4-20mA direct current output mainly uses in the scene electric quantity transmitting instrument's application, the direct-current output simulation (changes delivers) the object to be possible to dispose, disposition hypothesis content following table:

Setting Content	Description
Analog output 1 Related to	Change delivers subject can reach 27, can either setting one: 0 means A phase current 1 means B phase current 2 means C phase current 3 means zero sequence current 4 means A phase voltage 5 means B phase voltage 6 means C phase voltage 7 means AB line voltage 8 means BC line voltage 9 means CA line voltage 10 means A phase active power; 11 means B phase active power; 12 means C phase active power; 13 means total active power; 14 means A phase reactive power; 15 means B phase reactive power; 16 means C phase reactive power; 17 means total reactive power; 18 means A phase apparent power 19 means B phase apparent power 20 means C phase apparent power 21 means total apparent power

	22 means A phase power factor 23 means B phase power factor 24 means C phase power factor 22 means total power factor 26 means Frequency
Analog output 1 20 mA related parameter	Can freely setting
Analog output 1 4mA related parameter	Can be freely setting, but must smaller than Those of 20mA.
Analog output 2	Setting means same as Analog output 1

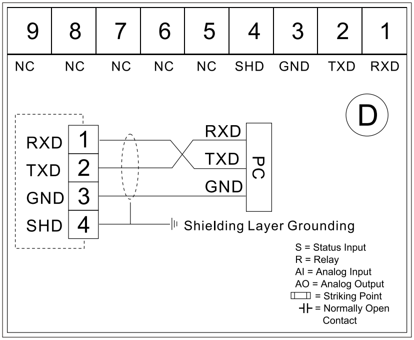
Analog input/output Module wiring following chart (4) shows:


9
8
7
6
5
4
3
2
1
NC
AI2-
AI2+
AI1-
AI1+
AO2-
AO2+
AO1-
AO1+
C
AO1+ 1
AO1- 2
AO2+ 3
AO2- 4
AI1+ 5
AI1- 6
AI2+ 7
AI2- 8
Load ≤600Ω
Load ≤600Ω
A
+ Current Source 4-20mA −
V
+ Voltage Source 0-5VDC −
S = Status Input
R = Relay
AI = Analog Input
AO = Analog Output
= Striking Point
= Normally Open Contact

Chart（4）

2.10.5 Communication Module

The Power meter provides the expandable RS232 module, installs the position to correspond on main engine's D slot, this module applies in needs the RS232 mailing address the situation, but the communication distance should limit in 10m, uses the three-wire system connection, the RS232 module wiring following chart (5) shows.


9
8
7
6
5
4
3
2
1
NC
NC
NC
NC
NC
SHD
GND
TXD
RXD
D
RXD 1
TXD 2
GND 3
SHD 4
RXD
TXD
GND
PC
Shielding Layer Grounding
S = Status Input
R = Relay
AI = Analog Input
AO = Analog Output
= Striking Point
= Normally Open Contact

Chart（5）

3、Safety Precaution

Before the installment, the movement, the maintenance, operate this equipment, please careful reading following safe prompt

⚠ Danger & Warning

- This equipment existence electricity danger, if does not avoid, will cause the death or the injure severely
- The equipment should let the professional qualification personnel to carry on the installment, the operation, to use and to maintain. Regarding not any consequence which creates according to this handbook operation, this company will not undertake any responsibility.

⚠ **Electric shock, detonation and electric arc dangerous**

- The equipment should let the professional qualification personnel to carry on the installment, the operation, to use and to maintain.
- Be careful of the potential hazard, completes individual protection, cannot work alone
- Before carries on the installment, the operation, the use and the maintenance of the equipment, should shut off electric power supply to this equipment.
- Must use the qualified Voltage Measurement Instruments to ensure all of the power supply is shut off.
- Equipment's success movement relies on correct processing, the installment and the operation. Neglect basically installs the request possibly to create the personal injuries, also will possibly create to the equipment damages
- Cannot carry on the bypass absolutely to the exterior fuse
- Cannot cause the voltage transmitter absolutely (PT) carries on secondarily short-circuits.
- Cannot cause the current transmitter absolutely (CT) carries on the opening secondarily. Before installment or demolition wiring should use the pipe nipple block to carry on secondarily to CT short-circuits.
- The equipment should install in an appropriate insulation and in the fire protection engine case.

Possibly will not cause the death or the serious personal injuries according to the above explanation operation!

4、Installment and Wiring

4.1 Packing List and Marker

PMC200 Multifunctional Power Meter	1 pc
Installment & User Manual	1 pc
Fixed Fastener	2 Pcs
AUX Module (as per Purchase)	4 pcs
Screw BM2.5X64（Fixed the AUX modules）	8 pcs

4.2 Installment & Working circumstance

Operating temperature: - 25℃ ～+55℃

Storage temperature：-35℃ ～ +70℃

Humidity：5% ～ 95%RH，No condensation.

The equipment should install in an appropriate insulation and in the fire protection engine case.

4.3 Installment

1、PMC200 Multifunctional Power Meter size as below:

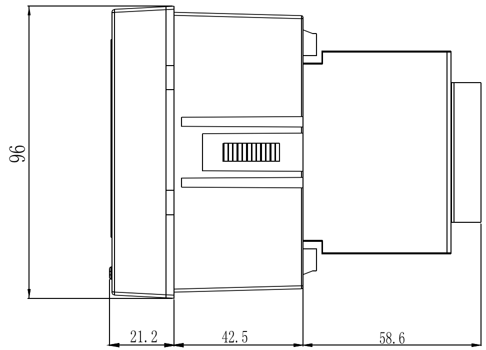

96
21.2
42.5
58.6

Chart (6) outer size

2、Insert the PMC200 meter into hole of 92.5mm X 92.5mm, as Chart (7)

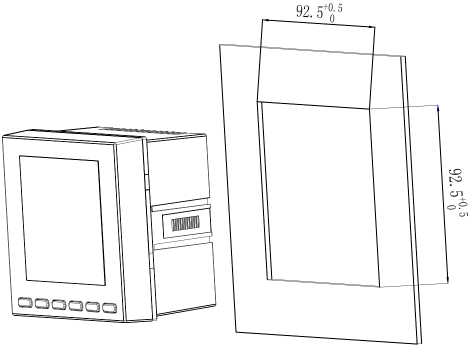

92.5$^{+0.5}_{0}$
92.5$^{+0.5}_{0}$

Chart (7) Front side installment show

3、Use the two fastener to fixed into the left/right side of the host, to fixed the PMC200 meter,

As chart (8).

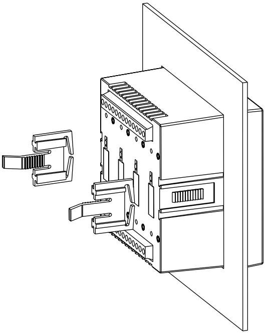


Chart (8) Back side of the installment show

4、Use the screw BM2.5X64 fix the AUX module onto the host, as chart (9)

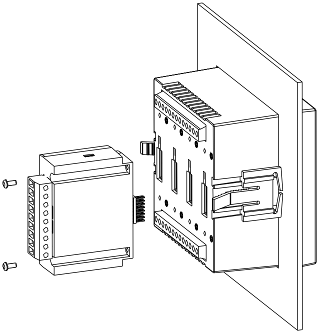


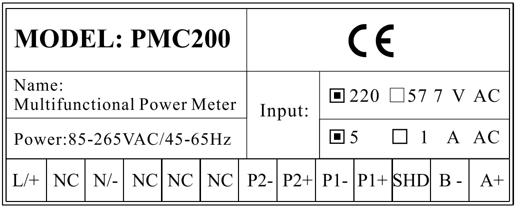
Chart (9) AUX module installment show

Note: must install the fastener before install the AUX module.

4.4 Wiring

4.4.1 Terminal and Marker

1、 Marker 1 on top of Host, as chart (10) as below:



MODEL: PMC200

CE

Name:
Multifunctional Power Meter

Power:85-265VAC/45-65Hz

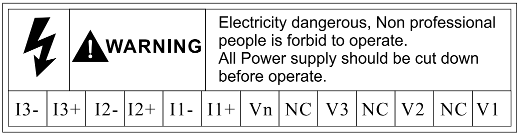
Input:
☒220 ☐57 7 V AC
☒5 ☐ 1 A AC

L/+	NC	N/-	NC	NC	NC	P2-	P2+	P1-	P1+	SHD	B -	A+

Chart (10) Marker 1

Code	Name	Description
1、3	L/+、N/-	Working Power supply input
2、4	NC、NC	Empty
5、6	NC、NC	Empty;
7、8	P2-、P2+	Reactive power pulse output, No-power-optocoupler Isolate;
9、10	P1-、P1+	Active power pulse output, No-power-optocoupler Isolate;
11、12	B-、A+	RS485 Communication Port
13	SHD	RS485 Shielding layergrounding;

2、 Marker 2 on bottom of Host, as chart (11) as below:



WARNING

Electricity dangerous, Non professional people is forbid to operate.
All Power supply should be cut down before operate.

I3-	I3+	I2-	I2+	I1-	I1+	Vn	NC	V3	NC	V2	NC	V1

chart (11) Marker 2

Code	Name	Description
14、16、18、20	V1、V2、V3、Vn	Voltage input
21、22、23、24、25、26	I1+、I1-、I2+、I2-、I3+、I3-	Current input
15、17、19	NC、NC、NC	Empty

4.4.2 System Wiring pattern

The Power meter can directly connect without external PT when the measurement voltage is smaller than or equal to 264V (phase) /456V (line) , otherwise , it must needed. The power meter support various kinds of survey wiring pattern, the following diagrams explained these separately.

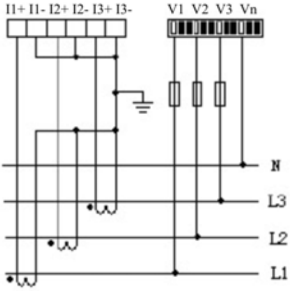


Chart (12) three phase four wire system, No PT, 3 CT

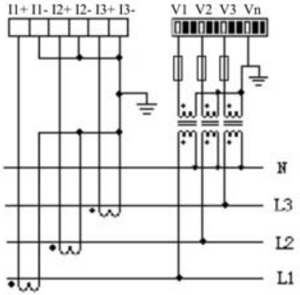

I1+ I1- I2+ I2- I3+ I3-
V1 V2 V3 Vn
N
L3
L2
L1

Chart (13) three phase four wire system, 3 PT, 3 CT

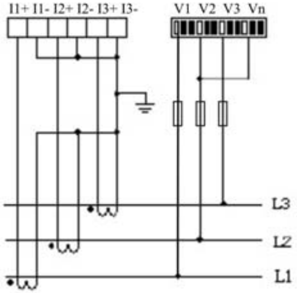

I1+ I1- I2+ I2- I3+ I3-
V1 V2 V3 Vn
L3
L2
L1

Figure (14) three-phase three-wire system, no PT, 3CT

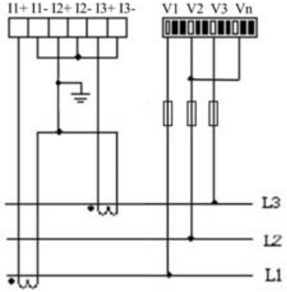

I1+ I1- I2+ I2- I3+ I3-
V1 V2 V3 Vn
L3
L2
L1

Figure (15) three-phase three-wire system, no PT, 2CT

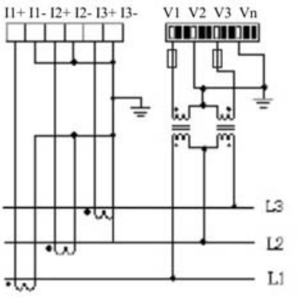

I1+ I1- I2+ I2- I3+ I3-
V1 V2 V3 Vn
L3
L2
L1

Figure (16) three-phase three-wire system, 2PT, 3CT

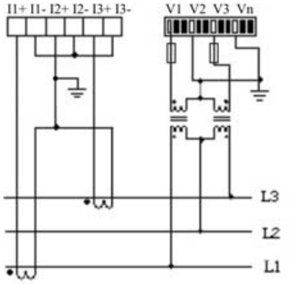

I1+ I1- I2+ I2- I3+ I3-
V1 V2 V3 Vn
L3
L2
L1

Figure (17) three-phase three-wire system, 2PT, 2CT

Note: The above diagram fuse should be rated at 250mA fuse.

4.4.3 Power Input Wiring

Compatible with AC and DC power input, AC input range :85-265VAC / 45-65Hz. DC input range :100-300VDC.

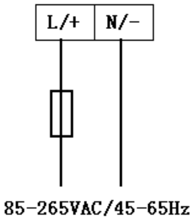

L/+
N/-
85-265VAC/45-65Hz

Figure (18) Power input terminal

Note: The above diagram fuse should be rated at 500mA fuse.

4.4.4 Active and reactive pulse output wiring

Pulse output is passive optocoupler isolated mode, Pull-up power supply must be provided by exterior.

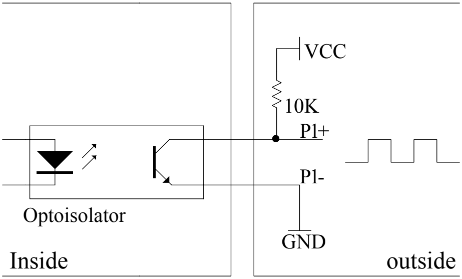

VCC
10K
P1+
P1-
GND
Optoisolator
Inside
outside

Figure (19) Pulse output wiring

5、Communication

5.1 Communication Connection

The connection method to refer to the below drawing, in the actual scene in order to prevent signal reflection, usually the end of the RS-485 network will be in parallel with an approximately 120-ohm resistors for signal matching.

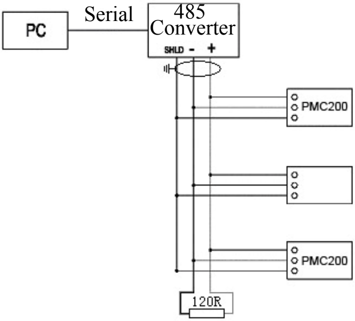


Figure (20) communications wiring

5.2 Communication media

Use shielded twisted pair 22, the same network can carry up to 32 power power meter, , while the bus is not over 1200 meters without repeaters.

5.3 Communication Protocol

PMC200 Power Meter supports the international generic MODBUS-RTUprotocol. Agreement on the specific communication protocol, please refer to the appropriate instructions.

Instrument can communicate with the master station prerequisite to the communications parameters are set correctly. The communication parameters of Power Meter include:.

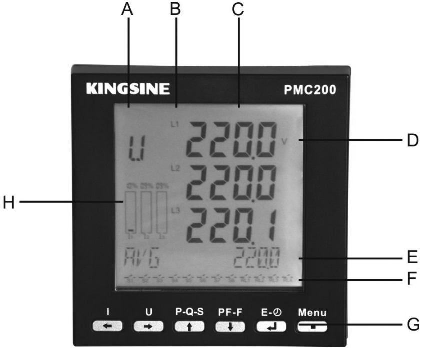
- Instrument Address: This is the logo on the instrument in the network, each Power Meter has a unique address, and the user can change.
- Communication baud rate: 1200,2400,4800,9600,19200(four options).

6、 Operation

6.1 Display Function

PMC200 Power Meter adopts STN LCD display with large screen and wide visual range. Operation buttons control the LCD backlight, when the screen saver is active, the different interface will be showed. Figure (21) shows the various parts of the Power Meter:

A) Measurement type
B) Measurement phase
C) Numerical display
D) Unit
E) Comprehensive numerical display
F) State variables display
G) Dual-function keys
H) Current load bar graphs



6.2 Button Function

Power Meter has 6 buttons and the button has a dual function, as follows:

Button	Display Mode	Setting Mode
[←]（I）	current shortcut key	cursor left key
[→]（U）	voltage shortcut key	cursor right key
[↑]（P-Q-S）	Active power, reactive power, apparent power shortcut key	Page Up, modify the numerical key
[↓]（PF-F）	power factor, frequency shortcut key	Page Down, modify the numerical key
[↵]（E-Time）	Active and reactive power, clock, DC input measurement shortcut key	Enter key
[■] (Menu)		Menu key

6.3 Display

The Power Meter interface shows the function menu by combining the different electrical parameters of the matrix methods. Repeatedly press the [■] key (Menu) to enter the menu of different functions, in different functional menu repeatedly press the other key to display different interface. Figure (21) for the screen displays a list of abbreviations.

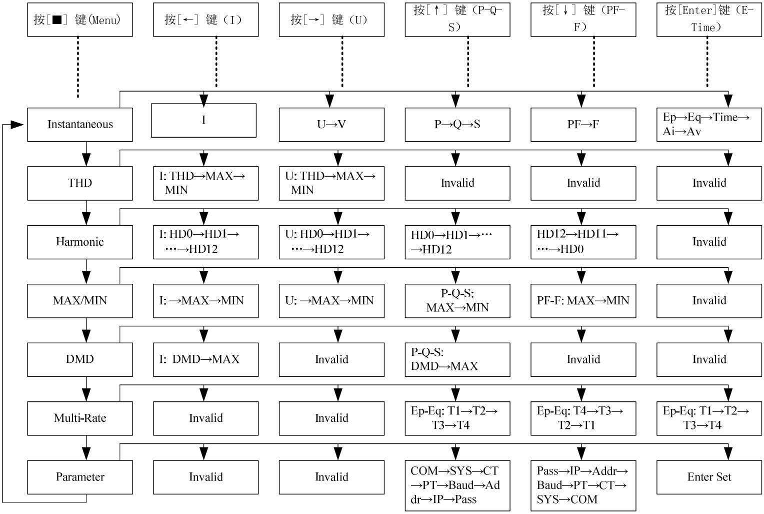

按[■] 键(Menu)
按[←] 键（I）
按[→] 键（U）
按[↑] 键（P-Q-S）
按[↓] 键（PF-F）
按[Enter]键（E-Time）
Instantaneous
I
U→V
P→Q→S
PF→F
Ep→Eq→Time→Ai→Av
THD
I: THD→MAX→MIN
U: THD→MAX→MIN
Invalid
Invalid
Invalid
Harmonic
I: HD0→HD1→···→HD12
U: HD0→HD1→···→HD12
HD0→HD1→···→HD12
HD12→HD11→···→HD0
Invalid
MAX/MIN
I: →MAX→MIN
U: →MAX→MIN
P-Q-S: MAX→MIN
PF-F: MAX→MIN
Invalid
DMD
I: DMD→MAX
Invalid
P-Q-S: DMD→MAX
Invalid
Invalid
Multi-Rate
Invalid
Invalid
Ep-Eq: T1→T2→T3→T4
Ep-Eq: T4→T3→T2→T1
Ep-Eq: T1→T2→T3→T4
Parameter
Invalid
Invalid
COM→SYS→CT→PT→Baud→Addr→IP→Pass
Pass→IP→Addr→Baud→PT→CT→SYS→COM
Enter Set

Figure (21) screen displays a list of abbreviations

6.4 Parameter Settings

6.4.1 Input Password

Only when the correct password entered, the parameters of power meter can be set. Please following the steps:

1. Any of the above Interface Parameter menu, press [↵] button to enter map (22) password authentication interface.

2. Press [←], [→] key to move the cursor, press [↑], [↓] keys to modify the value, enter the 3 digit password.

3. Press [↵] key after successful authentication the password into the

parameter setting interface

4. Press [■] key to exit the parameter setting state

Note: The factory default password: 000

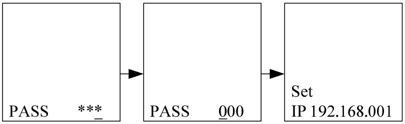

PASS ***_
PASS 000
Set
IP 192.168.001

Figure (22) password authentication interface

Press [↑], [↓] keys to select the instrument parameters to set, as shown in Figure (23) parameter setting interface is instrument IP, address, baud rate, PT transformation ratio, CT ratio, type of system, remove/change password , Hardware version and software version. These parameters setting is the same operation with the password.

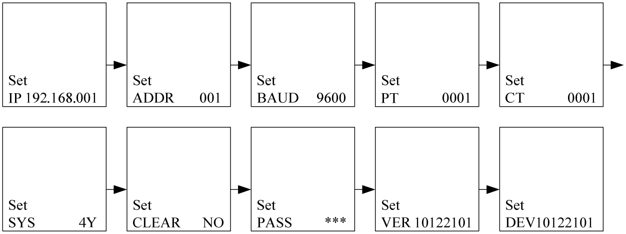

Set
IP 192.168.001
Set
ADDR 001
Set
BAUD 9600
Set
PT 0001
Set
CT 0001
Set
SYS 4Y
Set
CLEAR NO
Set
PASS ***
Set
VER 10122101
Set
DEV10122101

Figure (23) parameter setting interface

6.4.2 IP Setting

This parameter is used to set the device IP address. The parameters to be TCP / IP Ethernet expansion module support to be effective.

6.4.3 Address Setting

This parameter is used to set the device communication address. Power Meter supports MODBUS RTU communication protocol, the effective address range is 1 to 247.

6.4.4 Baud Rate Setting

This parameter is used to set the device baud rate. Serial communication speed can support 1200,2400,4800,9600 and 19200Bps.

6.4.5 PT PT transformation ratio setting

This parameter is used to set the device PT transformation ratio. Variable ratio is equal to PT primary side rating value divides PT secondary side rating value. If the external does not use PT, the PT transformation ratio is 1. PT transformation ratio ranges from 1 to 9999.

6.4.6 CT transformation ratio setting

This parameter is used to set the device CT transformation ratio. Variable ratio is equal to CT primary side rating value divides CT secondary side rating value. If the external does not use CT, the CT transformation ratio is 1. CT transformation ratio ranges from 1 to 9999.

6.4.7 System type setting

The parameters of the measurement system used to set the device type. Support for four line star and delta measurement mode. See connection methods on four specific content.

6.4.8 Clear

The parameters used for device input and output active and reactive power, multi-rate power, maximum and minimum, demand, SOE event record cleanup menu.

6.4.9 Version Information

To facilitate equipment maintenance, provide hardware and software version information for inquiries.

7、Maintenance and Troubleshooting

Possible problems	Possible Cause	Possible solutions
The power to impose control on the meter without display;	Power supply is not connected to the meter	■Confirm the L / +, N / - terminal to add the power supply ■ Check the power supply fuse is burned;
Meter data shown is not accurate or not you expect;	Voltage measurement is not correct;	■Check the system rated voltage, rated frequency, system type, PT transformation ratio is set correctly; ■ there is enough voltage on voltage input terminal ■Check the input fuse is burned; ■ Check the neutral connection is reliable;
	current measurement is not correct;	■ Check the system rated current, rated frequency, system type, CT transformation ratio is set correctly; ■Current input wiring is correct;
	power measurement is not correct;	■Check the system rated voltage, rated current, rated frequency, system type, PTCT transformation

		ratio is set correctly; ■ Voltage and current corresponding to the phase is correct; ■ Voltage, current transmitterpolarity (same name as the client) are correct;
can not communicate with the instrument remotely by computer	Instrument parameter settings are not correct	■ Check the mailing address settings are correct; ■ Check the communication baud rate settings are correct; ■ in the same RS485 line, mailing address settings are repeated;
	Communication line is not properly connected	■Check the meter communication cable;
Input / output state does not change;	input / output operation voltage is not correct	■ According to the external node type, check whether the correct jumper inside the module; ■ Check the external wiring is correct, the parameters match;
Relay does not operate;	Instrument parameter settings are not correct;	■ Check the relay operation mode settings are correct;
	Does not receive control commands;	■ Check the meter communication cable;

Analog output is not correct	Instrument parameter settings are not correct;	■ Check the analog output object is set correctly; ■ Check the corresponding analog value on the lower settings are correct;

Appendix A: Specifications

Electrical Characteristics		
Measurement Type		Three-phase three-wire AC system, three-phase four-wire communication system;
		Sampling rate per cycle: 64 times
Data refresh rate		1S；
Measurement Accuracy	Current	0.2%
	Voltage	0.2%
	Power	0.5%
	Frequency	0.05Hz
	Active Energy	1.0%
	Reactive Energy	2.0%
	AI	0.5%
	AO	0.5%
Input voltage	Measuring	3 X 220/380V (Direct Access)

characteristics	voltage	3 X 57.7/100V(Via transmitterAccess)
	Allowed overload	1.2 times / continuous
	Input impedance	1.8MΩ
Input current characteristics	Measuring current	5A or 1A (Via transmitterAccess)
	Allowed overload	1.2 times / continuous
	Input impedance	<0.1Ω
Binary input	Working voltage	12~24 VDC
	Input impedance	12KΩ
	Isolation voltage	2KV
Relay output	Node Type	Mechanical shock
	Node capacity	220 VAC/5A、30 VDC/5A
4-20mA input measurement	Measuring current	4-20mA
	Allowed load	1.2 times / continuous

	Input impedance	10Ω
	Isolation voltage	2KV
0-5V DC input measurement	Measuring voltage	0-5V
	Allowed Load	1.2 times / continuous
	Input impedance	12.5KΩ
	Isolation voltage	2KV
4-20mA DC output	Open circuit voltage	15VDC
	Load capacity	≤600Ω
	Isolation voltage	2KV
Power supply	AC	85~265 VAC/45-65Hz
	DC	100~300 VDC
	Power	< 3W
Mechanical properties		
Weight		0.5kg
IP protection grade		panel IP52, body IP30
Size	Host	96 X 96 X 72 mm
	Host and	96 X 96 X 120 mm

	module	
Operating temperature	Display	-20~70℃
	Instrument	-25~70℃
Storage temperature	instrument and display	-40~85℃
Relative humidity		5% - 90%RH， No condensation
EMC		
Electrostatic discharge interference		IEC 61000-4-2,Level 4
Group of anti-fast transient pulse		IEC 61000-4-4,Level 4
Anti-impact		IEC 61000-4-5,Level 3
Anti-frequency magnetic field		IEC 61000-4-8,Level 3
Electrical insulation performance		
Insulation resistance		GB/T13729，>50MΩ
frequency withstand voltage		GB/T13729，AC 2KV 50Hz /1min
Impulse voltage		GB/T13729，5KV，1.2/50us

Appendix B: Register List

Overview of communication protocol

MODBUS RTU protocol communication protocol and standard serial RS485 communication port are used for Power Meter. Information transfer mode is asynchronous, 1 start bit, 8 data bits, 1 stop bit, no parity. Each package contains the address of frame data field, function code field, data field and checksum field. The maximum length of a data package is 255 bytes.

Address field

Parcels from the station address field length is one byte. A single device address range from the station 1 to 247. If the station receives an address from the address field information consistent with its own parcel, the parcel should be included in the implementation of the command. Parcels from the station in response to address the domain of their own.

Function code field

Parcels in the domain of length onebyte, to inform what action should be implemented from the station. Response from the station master package should contain the same operation requested domain bytes.

Related function code as following:

Function Code	**Meaning**	**Function**
0x03	Read register	access to the current power meter's values of one or more consecutive registers
0x10	Set register	the specified value written to power meter of one or more consecutive registers
0x05	Bite setting	control a relay or a bit of a register of the current power meter

Data Domain

Data field length of the parcel is determined according to its specific function. Data field using big byte before the low byte in the latter mode;

Check Domain

MODBUS-RTU mode 16-bit CRC checksum. Equipment should be sent parcel data for each calculation of CRC16, the final results placed into the checksum field. Package should also be on the receiving device in each of the data (in addition to checking the domain outside) for CRC16 calculation, compare results and verify the domain. Only the same package can be accepted.

- Exception response:

If the master station sends an illegal package to this Set, or requests a valid data register, the exception response will be generated.

The exception data response consist of the slave address, 80H + original function code, exception code and verify domains. The following table shows the exception code meaning:

Exception code	Remarks
01H	Received illegal operate Function code
02H	Received illegal Register Address
03H	Received illegal Data

- Broadcast command

This Set support broadcast command with slave address as 0X00 but no echo.

- Read Register

The master station sends a command		Slave station normal response	
Slave Address	1 byte	Slave Address	1 byte
Function code 03	1 byte	Function code 03	1 byte
Register Originate Address	2 byte	Data Area byte (2*Register Pcs)	1 byte
Register Pcs	2 byte	First Register Data	2 byte
CRC16	2 byte	N-th Register Data	-----
		CRC16	2 byte

- Setting Register

The master station sends a command		Slave station normal response	
Slave Address	1 byte	Slave Address	1 byte
Function code 10	1 byte	Function code 10	1 byte
Register Originate Address	2 byte	Register Originate Address	2 byte
Register Pcs	2 byte	Register Pcs	2 byte
Data Area byte No. (2*Register Pcs)	1 byte	CRC16	2 byte
First Register Data	2 byte		
N-th Register Data	-----		
CRC16	2 byte		

- Bit-Write Register

Bit-write register can control relays or bit register by send control commands: that 0xFF00 as write 1 (closed a relay)0x0000 as write 0 (release of a relay), Others are all invalid.

Master sends the command:

Slav Address	Function code	Originate Address	control command	CRC16
1 byte	05	2 byte	2 byte	2 byte

Normal response from Slave station:

Slav Address	Function code	Originate Address	Register State	CRC16
1 byte	05	2 byte	2 byte	2 byte

- Register Protocol

Data Type Description:

Character	**Description**
INT	16-bit signed
UINT	16-bit unsigned
LONG	32-bit signed
ULONG	32-bit unsigned

Actual value Calculation:

1, Current actual value = communication value * CT * unit;

2, voltage actual value = communication value * PT * unit;

3, Power actual value = Communications value * PT * CT * units;

Register List

Current Register List

Register	**Name**	**Attribute**	**Unite**	**Remarks**
40001	A-Phase Current	R	0.001A	UINT
40002	B-Phase Current	R	0.001A	UINT
40003	C-Phase Current	R	0.001A	UINT
40004	Zero-sequence Current	R	0.001A	UINT
40005	3-Phase Current average Value	R	0.001A	RESV, Overall back to 0
40006	Max. Unbalanced current	R	0.1%	RESV, Overall back to 0

Voltage Register List

Register	**Name**	**Attribute**	**Unite**	**Remarks**
40007	A-B Line Voltage	R	0.01V	UINT
40008	B-C Line Voltage	R	0.01V	UINT
40009	C-A Line Voltage	R	0.01V	UINT
40010	Line Voltage average Value	R	0.01V	UINT
40011	Max. unbalanced Line Voltage	R	0.1%	RESV, Overall back to 0
40012	A-Phase -Phase Voltage	R	0.01V	UINT
40013	B-Phase -Phase Voltage	R	0.01V	UINT
40014	C-Phase -Phase Voltage	R	0.01V	UINT
40015	Phase Voltage average Value	R	0.01V	UINT
40016	Max. unbalanced Phase Voltage	R	0.1%	RESV, Overall back to 0
40017	Voltage N-R	R	0.01V	RESV, Overall back to 0

Power Register List

Register	**Name**	**Attribute**	**Unite**	**Remarks**
40018	A-Phase Active Power (L)	R	0.1W	LONG
40019	A-Phase Active Power (H)	R	0.1W	
40020	B-Phase Active Power (L)	R	0.1W	LONG

Register	**Name**	**Attribute**	**Unite**	**Remarks**
40021	B-Phase Active Power (H)	R	0.1W	
40022	C-Phase Active Power (L)	R	0.1W	LONG
40023	C-Phase Active Power (H)	R	0.1W	
40024	Overall Active Power (L)	R	0.1W	LONG
40025	Overall Active Power (H)	R	0.1W	
40026	A-Phase Reactive Power (L)	R	0. 1Var	LONG
40027	A-Phase Reactive Power (H)	R	0. 1Var	
40028	B-Phase Reactive Power (L)	R	0. 1Var	LONG
40029	B-Phase Reactive Power (H)	R	0. 1Var	
40030	C-Phase Reactive Power (L)	R	0. 1Var	LONG
40031	C-Phase Reactive Power (H)	R	0. 1Var	
40032	Overall Reactive Power (L)	R	0. 1Var	LONG
40033	Overall Reactive Power (H)	R	0. 1Var	
40034	A-Phase Apparent power (L)	R	0.1VA	ULONG
40035	A-Phase Apparent power (H)	R	0. 1VA	
40036	B-Phase Apparent power (L)	R	0. 1VA	ULONG
40037	B-Phase Apparent power (H)	R	0. 1VA	
40038	C-Phase Apparent power (L)	R	0. 1VA	ULONG
40039	C-Phase Apparent power (H)	R	0. 1VA	
40040	Overall Apparent power (L)	R	0. 1VA	ULONG
40041	Overall Apparent power (H)	R	0. 1VA	

Power factor Register List

Register	**Name**	**Attribute**	**Unite**	**Remarks**
40042	A-Phase Power factor	R	0.001	INT
40043	B-Phase Power factor	R	0.001	INT
40044	C-Phase Power factor	R	0.001	INT
40045	Overall Power factor	R	0.001	INT

Frequency Register List

Register	**Name**	**Attribute**	**Unite**	**Remarks**
40046	Frequency	R	0.01Hz	UINT

Energy Register List

Register	**Name**	**Attribute**	**Unite**	**Remarks**
40047	Input Active Energy(L)	R	0.1kWh	ULONG
40048	Input Active Energy(H)	R	0.1kWh	
40049	Input Reactive Energy(L)	R	0.1kVarh	ULONG
40050	Input Reactive Energy(H)	R	0.1kVarh	
40051	Output Active Energy(L)	R	0.1kWh	ULONG
40052	Output Active Energy(H)	R	0.1kWh	
40053	Output Reactive Energy(L)	R	0.1kVarh	ULONG
40054	Output Reactive Energy(H)	R	0.1kVarh	
40055	Overall Apparent Energy (L)	R	0.1kVAh	ULONG
40056	Overall Apparent Energy (H)	R	0.1kVAh	

Remarks: 40057-40069 reserve with forbidden.

Harmonic distortion Register List

Register	**Name**	**Attribute**	**Unite**	**Remarks**
40070	A-Phase Current THD	R	0.1%	UINT
40071	B-Phase Current THD	R	0.1%	UINT
40072	C-Phase Current THD	R	0.1%	UINT
40073	Zero-sequence Current THD	R	0.1%	RESV， Overall back to 0
40074	A-Phase (A-B Line)Voltage THD	R	0.1%	UINT
40075	B-Phase (B-C Line)Voltage THD	R	0.1%	UINT
40076	C-Phase (C-A Line)Voltage THD	R	0.1%	UINT
40077	Voltage N-R THD	R	0.1%	RESV， Overall back to 0

Harmonic Analysis Register List

Register	**Name**	**Attribute**	**Unite**	**Remarks**
40078+31	A-Phase Current Harmonic Contents	R	0.1%	Refer Harmonic -Data Stencil
40110+31	B-Phase Current Harmonic Contents	R	0.1%	Refer Harmonic -Data Stencil
40142+31	C-Phase Current Harmonic Contents	R	0.1%	Refer Harmonic -Data Stencil
40174+31	Zero-sequence Current Harmonic Contents	R	0.1%	RESV，Overall back to 0

Register	Name	Attr	Unite	Remarks
40206+31	A-Phase (A-B Line)Voltage Harmonic Contents	R	0.1%	Refer Harmonic -Data Stencil
40238+31	B-Phase (B-C Line) Voltage Harmonic Contents	R	0.1%	Refer Harmonic -Data Stencil
40270+31	C-Phase (C-A Line) Voltage Harmonic Contents	R	0.1%	Refer Harmonic -Data Stencil
40302+31	Voltage N-R Harmonic Contents	R	0.1%	RESV，Overall back to 0

Remarks: 40334~40349reserve with forbidden.

Harmonic Data Stencil

Register	Name	Attribute	Unite	Remarks
Base Address	H0 DC Contents	R	0.1%	UINT
Base Address +1	H1 - Harmonic Contents	R	0.1%	UINT
Base Address +2	H2 Harmonic Contents	R	0.1%	UINT
Base Address +3	H3 Harmonic Contents	R	0.1%	UINT
------	------	-----	------	------
Base Address +30	H30 Harmonic Contents	R	0.1%	UINT
Base Address +31	H31 Harmonic Contents	R	0.1%	UINT

Multi-tariff Energy Register List

Register	Name	Attribute	Unite	Remarks

Register	**Name**	**Attribute**	**Unite**	**Remarks**
40350	Overall Multi-tariff Timeslot Pcs	R/W	-	0 as No;Max. 8pcs
40351	Timeslot 1 Originate Time	R/W	-	0~47, 24h divide as 48pcs Timeslot
40352	Timeslot 1rate	R/W	-	0~3 as 4pcs rate 0 as Peak;1 as Valley; 2 as Flat;3 as Sharp
40353	Timeslot 2 Originate Time	R/W	-	0~47
40354	Timeslot 2 Rate	R/W	-	0~3
40355	Timeslot 3 Originate Time	R/W	-	0~47
40356	Timeslot 3 Rate	R/W	-	0~3
40357	Timeslot 4 Originate Time	R/W	-	0~47
40358	Timeslot 4 Rate	R/W	-	0~3
40359	Timeslot 5 Originate Time	R/W	-	0~47
40360	Timeslot 5 Rate	R/W	-	0~3
40361	Timeslot 6 Originate Time	R/W	-	0~47
40362	Timeslot 6 Rate	R/W	-	0~3
40363	Timeslot 7 Originate Time	R/W	-	0~47
40364	Timeslot 7 Rate	R/W	-	0~3
40365	Timeslot 8 Originate Time	R/W	-	0~47
40366	Timeslot 8 Rate	R/W	-	0~3

Register	**Name**	**Attribute**	**Unite**	**Remarks**
40367+9	Rate 0 Energy	R	-	Refer next table: Rate Structure Stencil
40377+9	Rate 1 Energy	R	-	
40387+9	Rate 2 Energy	R	-	
40397+9	Rate 3 Energy	R	-	

Rate Structure Stencil

Register	**Name**	**Attribute**	**Unite**	**Remarks**
Base Address	Input Active Energy(L)	R	0.1kWh	ULONG
Base Address +1	Input Active Energy(H)	R	0.1kWh	
Base Address +2	Input Reactive Energy(L)	R	0.1kVarh	
Base Address +3	Input Reactive Energy(H)	R	0.1kVarh	
Base Address +4	Output Active Energy(L)	R	0.1kWh	
Base Address +5	Output Active Energy(H)	R	0.1kWh	
Base Address +6	Output Reactive Energy(L)	R	0.1kVarh	
Base Address +7	Output Reactive Energy(H)	R	0.1kVarh	
Base Address +8	Overall Apparent Energy (L)	R	0.1kVAh	
Base Address +9	Overall Apparent Energy (H)	R	0.1kVAh	

Min. /Max. Value Register List

Register	**Name**	**Attribute**	**Unite**	**Remarks**
40407+9	Min. /Max. Current	R	0.001A	
40417+9	Min. /Max. Line Voltage L-L	R	0.01V	

Register	**Name**	**Attribute**	**Unite**	**Remarks**
40427+9	Min. /Max. -Phase Voltage L-N	R	0.01V	Refer Min. /Max. Value Stencil
40437+9	Min. /Max. Overall Active Power	R	0.1W	
40447+9	Min. /Max. Overall Reactive Power	R	0.1Var	
40457+9	Min. /Max. Overall Apparent power	R	0.1VA	
40467+9	Min. /Max. Overall Power factor	R	0.001	
40477+9	Min. /Max. Frequency	R	0.01Hz	
40487+9	Min. /Max. Current THD	R	0.1%	
40497+9	Min. /Max. Voltage THD	R	0.1%	

Min. /Max. Value Stencil

Register	**Name**	**Attribute**	**Unite**	**Remarks**
Base Address	Min. Value Occurred Time (L)	R	1S	ULONG ULONG UNIX Time form
Base Address +1	Min. Value Occurred Time (H)	R	-	
Base Address +2	Min. Value (L)	R	-	LONG
Base Address +3	Min. Value (H)	R	-	

Register	**Name**	**Attribute**	**Unite**	**Remarks**
Base Address +4	Min. Value Phase Place	R	-	0 as No-Phase 1 as A-Phase 2 as B-Phase 3 as C-Phase
Base Address +5	Max. Value Occurred Time (L)	R	1S	ULONG UNIX Time form
Base Address +6	Max. Value Occurred Time (H)	R	-	
Base Address +7	Max. Value (L)	R	-	LONG
Base Address +8	Max. Value (H)	R	-	
Base Address +9	Max. Value Phase	R	-	0 as No-Phase 1 as A-Phase 2 as B-Phase 3 as C-Phase

Demand Register List

Register	**Name**	**Attribute**	**Unite**	**Remarks**
40507	Demand Compute cycles	R/W	min	1~60
40508	A-Phase Current Demand	R	0.001A	UINT
40509	B-Phase Current Demand	R	0.001A	UINT

Register	**Name**	**Attribute**	**Unite**	**Remarks**
40510	C-Phase Current Demand	R	0.001A	UINT
40511	Zero-sequence Current Demand	R	0.001A	UINT
40512	Overall Active Power Demand (L)	R	0.1W	LONG
40513	Overall Active Power Demand (H)	R	0.1W	
40514	Overall Reactive Power Demand (L)	R	0.1Var	LONG
40515	Overall Reactive Power Demand (H)	R	0.1Var	
40516	Overall Apparent power Demand (L)	R	0.1VA	ULONG
40517	Overall Apparent power Demand (H)	R	0.1VA	

Peak Demand Register List

Register	**Name**	**Attribute**	**Unite**	**Remarks**
40518+3	A-Phase Current Peak Demand	R	0.001A	Refer Peak Demand Stencil
40522+3	B-Phase Current Peak Demand	R	0.001A	Refer Peak Demand Stencil
40526+3	C-Phase Current Peak Demand	R	0.001A	Refer Peak Demand Stencil
40530+3	Zero-sequence Current Peak Demand	R	0.001A	Refer Peak Demand Stencil
40534+3	Overall Active Power Peak Demand	R	0.1W	Refer Peak Demand Stencil
40538+3	Overall Reactive Power Peak Demand	R	0.1Var	Refer Peak Demand Stencil

Register	**Name**	**Attrbute**	**Unite**	**Remarks**
40542+3	Overall Apparent power Peak Demand	R	0.1VA	Refer Peak Demand Stencil

Peak Demand Stencil

Register	**Name**	**Attribute**	**Unite**	**Remarks**
Base Address	Peak Occurred Time (L)	R	1S	ULONG UNIX Time form
Base Address +1	Peak Occurred Time (H)	R	-	
Base Address +2	Peak Demand (L)	R	-	LONG
Base Address +3	Peak Demand (H)	R	-	

Remote control Register List

Register	**Name**	**Attribute**	**Remarks**
40546	On-off Input & Relay Output State	R	Digital 00~07:correspond Switch S1~S8; Digital 08~11:correspond Relay RL1~RL4; Digital 12~15: remain Each Digital Value: 0 as Switch or Relay Off; 1 as Switch or Relay On;
40547	Relay 1Working model	R/W	High byte : 0 as Local Control Model; 1 as Remote Control Model; Low byte :

Register	**Name**	**Attribute**	**Remarks**
			0 as Normal Working model; 1 as Locking Working model; 2 as Timing Working model;
40548	Relay 1 Timer value	R/W	0-3600
40549	Relay 2 Working model	R/W	Alike Relay 1
40550	Relay 2 Timer value	R/W	0-3600
40551	Relay 3 Working model	R/W	Alike Relay 1

Relay control write register (function code 0x05)

Register	**Name**	**Attribute**	**Description**
40555	Relay 1	W	Can be control as remote control mode Write 0xffoo relay close Write 0x0000 relay disconnection
40556	Relay 2	W	Same as above
40557	Relay 3	W	Same as above
40558	Relay 4	W	Same as above

Warning setting register list

Register	Name	Attribute	Description
40559	Logic warning channel and limit value warning channel status	R	Bit 00-05: relative limit value warning channel status RA1-RA6 Bit 08-11: relative logic warning channel status LA1-LA4 Bit 12-15: reservation Current bit is： 0 is mean that channel did not send the warning 1 is mean that this channel had sent the warning
40560+3	Limit value warning channel RA1	R/W	Please refer to limit value warning type
40564+3	Limit value warning channel RA2	R/W	Please refer to limit value warning type
40568+3	Limit value warning channel RA3	R/W	Please refer to limit value warning type
40572+	Limit value	R/W	Please refer to limit value warning type

Register	Name	Attribute	Description
3	warning channel RA4	W	
40576+3	Limit value warning channel RA5	R/W	Please refer to limit value warning type
40580+3	Limit value warning channel RA6	R/W	Please refer to limit value warning type
40584+3	Logic warning channel LA1	R/W	Please refer to logic warning type
40588+3	Logic warning channel LA2	R/W	Please refer to logic warning type
40592+3	Logic warning channel LA3	R/W	Please refer to logic warning type
40596+3	Logic warning channel LA4	R/W	Please refer to logic warning type

Limit value warning type

Register	Name	Attribute	Description
Base address	Limit value mode	R/W	Bit 7 of high byte is activation control bit when bit is 0 which mean limit channel prohibit to use When bit is 1 which meant limit value channel to be activated Bit 6 of high byte is limit value type control bit When bit is 0 which mean upper limit action when bit is 1 which mean lower limit action Bit 5-00 of high byte: (reservation) Low byte is limit value object 0 is A phase current 1 is B phase current 2 is C phase current 3 is zero-sequence current 4 is max unbalance current; (reservation) 5 is current phase lost 6 is A phase voltage 7 is B phase voltage

Register	**Name**	**Attribute**	**Description**
			8 is C phase voltage 9 is AB line voltage 10 is BC line voltage 11 is CA line voltage 12 is max unbalance voltage (reservation) 13 is max unbalance voltage(reservation) 14 is voltage lost
Base address +1	Limit value	R/W	UINT
Base address+ 2	Limit value warning slow-moving time	R/W	0-255
Base address+ 3	limit value warning against output object	R/W	No.0 mean that warning output object is empty No.1 mean that warning output object is relay 1 No.2 mean that warning output object is relay 2 No.3 mean that warning output

Register	Name	Attribute	Description
			object is relay 3 No.4 mean that warning output object is relay 4

Logic warning type

Register	Name	Attribute	Description
Base address	Logic mode	R/W	Bit 15-12: logic type control bit Bit 11-08: logic object 3 control bit Bit 07-04: logic object 2 control bit Bit 03-00: logic object 1 control bit Logic type control bit define: 0 : logic channel prohibit to use 1 mean as logic 2 mean or logic Logic object control bit define: 0: non-judge this object 1 is binary S1 2 is binary S2 3 is binary S3 4 is binary S4 5 is binary S5 6 is binary S6 7 is binary S7 8 is binary S8

Register	Name	Attribute	Description
			9 is limit value warning channel RA1 10 is limit value warning channel RA2 11 is limit value warning channel RA3 12is limit value warning channel RA4 13 is limit value warning channel RA5 14 is limit value warning channel RA6 15: reservation
Base address+ 1	Real value condition	R/W	Bit 15-03: reservation Bit 02: logic object 3 real value condition Bit 01: logic object 2 real value condition Bit 00: logic object 1 real value condition Current bit is: 0: logic object is 0 to be fake Logic object is 1 to be real 1: logic object 0 to be real

Register	Name	Attribute	Description
			Logic object is 1 to be fake
Base address+ 2	Logic warning slow-moving time	R/W	0-255
Base address+ 3	Logic warning output object	R/W	0: warning output object is empty 1: warning output object is relay 1 2: warning output object is relay2 3: warning output object is relay3 4: warning output object is relay 4

SOE event record register list SOE

Register	Name	Attribute	Description
40600+ 3	SOE event record 1	R	Please refer to SOE event record type
40604+ 3	SOE event record 2	R	Please refer to SOE event record type
40608+ 3	SOE event record 3	R	Please refer to SOE event record type
40612+ 3	SOE event record 4	R	Please refer to SOE event record type
40616+ 3	SOE event record 5	R	Please refer to SOE event record type
	---------------		

Register	Name	Attribute	Description
40980+3	SOE event record 96	R	Please refer to SOE event record type
40984+3	SOE event record 97	R	Please refer to SOE event record type
40988+3	SOE event record 98	R	Please refer to SOE event record type
40992+3	SOE event record 99	R	Please refer to SOE event record type
40996+3	SOE event record 100	R	Please refer to SOE event record type

SOE event record type SOE

Register	Name	Attribute	Description
Base address	Event type	R	The max word bit is event change status Current bit is 0 to be change status 1→0 Current bit is 1 to be change status 0→1 The rest word bit is event type 0-7 relative to binary S1-S8 8-11 relative to relay RL1-RL4 12-17 is limit value warning

Register	Name	Attribute	Description
			RA1-RA6 18-21 is logic warning LA1-LA4 Other value invalidation 0x7FFF is event to be empty
Base address+ 1	Event happen time (millisecond)	R	0-1000
Base address +2	Event happen time (low word)	R	U LONG UNIX time format
Base address +3	Event happen time (high word)	R	

Simulation quantity input output register list

Register	Name	Attribute	Unite	Remarks
41000	Input simulation quantity 1 4-20mADC measurement value	R	0.01n	UINT
41001	Input simulation quantity 2 0-5VDC	R	0.001	UINT

Register	Name	Attribute	Unite	Remarks
	measurement value			
41002	Output simulation quantity 1 4-20mADC relative object	R/W	-	0 is A phase current 1 is B phase current 2 is C phase current 3 is zero-sequence current 4 is A phase voltage 5 is B phase voltage 6 is C phase voltage 7 is AB line voltage 8 is BC line voltage 9 is CA line voltage 10 is A phase active power 11 is B phase active power 12 is C phase active power 13 is general active power 14 is A phase reactive power 15 is B phase reactive power

Register	Name	Attribute	Unite	Remarks
				16 is C phase reactive power 17 is general reactive power 18 is A phase apparent power 19 is B phase apparent power 20 is C phase apparent power 21 is general apparent power 22 is A phase power factor 23 is B phase power factor 24 is C phase power factor 25 general power factor 26 is frequency Other value invalidation
41003	Input simulation quantity 1 20mA relative value	R/W	-	UINT

Register	Name	Attribute	Unite	Remarks
41004	Output simulation quantity 1 4mA relative value	R/W	-	UINT
41005	Output simulation quantity 2 4-20mADC relative object	R/W	-	Same as above；
41006	Output simulation quantity 2 20mA relative value	R/W	-	UINT
41007	Output simulation quantity 2 4mA relative value	R/W	-	UINT

Note: 41008-41009 reservation, prohibit visit

Measurement setting and status register list

Register	Name	Attribute	Description
41100	Measurement system type	R/W	30 is three/three line system 40 is three/four line system
41101	CT variable ratio	R/W	0-9999
41102	PT variable ratio	R/W	0-9999
41103	Equipment address	R/W	1-247
41104	Communication	R/W	0=1200； 1=2400； 2=4800；

Register	Name	Attribute	Description
	baud rate		3=9600；4=19200；
41105	Equipment password	R/W	Reservation, total return to 0
41106	IP address (low word)	R/W	Reservation, total return to 0
41107	IP address (high word)	R/W	Reservation, total return to 0
41108	Active electric energy pulse constant	R/W	1000-5000
41109	Reactive electric energy pulse constant	R/W	1000-5000
41110	Humorous refresh status	R	0 : had refreshed 1: is calculating
41111	Humorous refresh frequency	R/W	Reservation, total return to 0 Reservation, total return to 0
41112	Screen protection display setting	R/W	Bit 15: phase voltage display interface Bit 14: line voltage display interface Bit 13: phase current display interface Bit 12: active power display

Register	Name	Attribute	Description
			interface Bit 11: reactive power display interface Bit 10: apparent power display interface Bit 09: power factor display interface Bit 08: frequency display interface Bit 07: input active electric energy display interface Bit 06: output active electric energy display interface Bit 05: input reactive electric energy display interface Bit 04: output reactive electric energy display interface Bit 03: date display interface Bit 02: time display interface Bit 01: input simulation quantity 1 display interface Bit 00: input simulation 2 display interface Current bit is : 0: no display

Register	Name	Attribute	Description
			1: display
41113	System time (low word)	R/W	ULONG
41114	System time (high word)	R/W	
41115	The time of last electricity restoration	R	0-255
41116	The last time for electricity time (low word)	R	ULONG
41117	The last time for electricity time (high word)	R	
41118	The last time for lost time(low word)	R	Reservation, total return to 0
41119	The last time for lost time(high word)	R	
41120	House dog restoration times	R	Reservation, total return to 0
41121	The last time of	R	Reservation, total return to 0

Register	Name	Attribute	Description
	house dog restoration time (low word)		
41122	The last time of house dog restoration time (high word)	R	
41123	Equipment hardware version (low word)	R	The highest bit is revised year The second high bit is revised month High bit is revised date Low bit is revised times
41124	Equipment hardware version (high word)	R	
41125	Equipment software version (low word)	R	The highest bit is revised year The second high bit is revised month High bit is revised date Low bit is revised times
41126	Equipment software version (high word)	R	
41127	Equipment code(low word)	R	The highest bit is revised year The second high bit is revised month High bit is revised date Low bit is revised times
41128	Equipment code(high word)	R	

Register	Name	Attribute	Description
41129	Equipment nameplate	R	High bit is rating voltage 1=100V；2=220V； 3=380V；6=660V； Low bit is rating current 1=1A；5=5A；

Reset refresh control bit write register(function code 0x05)

Register	Name	Attribute	Description
41130	Electric energy reset	W	Write 0xFF00 clear away
41131	Multi rate electric energy reset	W	Write 0xFF00 clear away
41132	Max Min value reset	W	Write 0xFF00 clear away
41133	Demand reset	W	Write 0xFF00 clear away
41134	SOE event record reset	W	Write 0xFF00 clear away
41135	System restoration	W	Write 0xFF00 restoration
41233	Refresh to manufacturing factory setting	W	Write 0xFF00 to refresh to manufacturing factory setting

Note: 41136-41199 reservation, prohibit visit

Appendix C Ordering Information

PMC200 Multifunctional Power Meter Selection Guide

Model :PMC200-A-B-C-D-E-F-G	
A Rated measuring voltage, current	
1	57.7/100V，5A
2	57.7/100V，1A
3	220/380V，5A
4	220/380V，1A
B Power system frequency	
1	50Hz
2	60Hz
C Power Supply	
1	85~265 VAC/45-65Hz，100~300 VDC
D Host A slot Expansion module	
0	No
1	8-channel binary input module
2	6-channel binary input module
E Host B slot Expansion module	
0	No
1	4 Relay Output Module
F Host C slot Expansion module	
0	No
1	Analog Input / Output Module ■ 1 AI : 4-20mA ■ 1 AI : 0-5V

	■ 2 AO : 4-20mA
G Host D slot Expansion module	
0	No
1	RS232 Communication module
2	TCP/IP module
3	ProfiBus-DP module

Warning: A Host can match maximum 4 modules

Example:Ordering model is : PMC200-3-1-1-1-1-1-0

That is , PMC200 with Rated measuring voltage, current: 220/380V 5A，Power system

Frequency :50Hz，Power Supply :85~265 VAC/45-65Hz，8-channel binary input module,

4 Relay Output Module and Analog Input / Output Module

Note:

- *The information provided in the manual may be slightly different due to different software version.*

- *right to interpret the said information reserved by Shenzhen Kingsine Electric Automation Co., Ltd.*

KINGSINE Kingsine Electric Automation Co., Ltd.
Address：6/F, Block 4-CD, TianAn Cyber Park,
Shenzhen 518040, China
Fax：+86 755-88352611
Technical support：+86-755-88352590 83418941
http：// www.kingsine.com.cn
E-mail：inquiry@kingsine.com.cn